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| 10/648,340 | 08/27/2003 | Kiyoshi Ogishima | 4034-40 | 5339 |

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| EXAMINER | |
|---|---|
| CHEN, WEN YING PATTY | |
| **ART UNIT** | **PAPER NUMBER** |
| 2871 | |

DATE MAILED: 12/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) |
|---|---|---|
| | 10/648,340 | OGISHIMA ET AL. |
| | Examiner | Art Unit |
| | W. Patty Chen | 2871 |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *11 September 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1,2,4-8 and 10-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4-8 and 10-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *11 September 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *9/11/06*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

## DETAILED ACTION

### *Response to Amendment*

Applicant's Amendment filed on Sept. 11, 2006 has been entered. Claims 20-26 are newly added per the Amendment filed, therefore, claims 1, 2, 4-8 and 10-26 are now pending in the current application.

### *Drawings*

The drawings were received on Sept. 11, 2006. These drawings are acceptable.

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-2, 4, 7-8, 10, 13, 20-21 and 25-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al. [A] (US 6567144) in view of Kim et al. [B] (US 2001/0019388).

<u>With respect to claim 1 (Amended)</u>: Kim et al. [A] disclose in Figure 4 (example cross-section as shown in Figure 7) a liquid crystal display device comprising

a first substrate (element 200), a second substrate (element 100), and a vertical alignment type liquid crystal layer (Column 1, line 16) including liquid crystal molecules having negative dielectric anisotropy (Column 1, lines 61-62) disposed between the first substrate and the second substrate, the liquid crystal display device being a vertical alignment type display wherein in an off state liquid crystal molecules of the liquid crystal layer are aligned substantially vertical (Column 1, lines 16-24) and at least one vertical alignment film (elements 15, 25) is provided for so aligning the liquid crystal molecules in the substantially vertical manner in the off state;

the device having a plurality of picture-element regions each defined by a first electrode (element 20) placed in the first substrate on the side facing the liquid crystal layer and a second electrode (element 10) placed in the second substrate to oppose to the first electrode via the liquid crystal layer,

in each of the plurality of picture-element regions, the liquid crystal layer having a plurality of liquid crystal regions different in the direction in which liquid crystal molecules tilt when a voltage is applied between the first electrode and the second electrode (as shown in Figure 4),

a protrusion (element 17 or 27) in a boundary region, defined as regions separating the plurality of liquid crystal regions from each other, for causing the liquid crystal molecules to tilt.

Kim et al. [A] failed to specifically disclose a light-shielding layer overlapping at least part of boundary region such that ends of the liquid crystal molecules closer to the substrate having the light-shield layer go away from the boundary region in the area where the boundary region overlaps the light-shielding layer and moreover that the light-shielding layer overlaps the protrusion but are formed on opposite substrate.

However, Kim et al [A] disclose in another embodiment as shown in Figure 16 that a light-shield layer (element 11) is formed in regions corresponding to the protrusion and the boundary of the picture-element regions, thus overlapping at least part of the boundary region defined as regions separating the plurality of liquid crystal regions and further, Kim et al. [B] teach in Figure 2B that the light-shield layer (element 25) is formed on opposite substrates with respect to the protrusion (element 53) such that the protrusion and the light-shield layer overlap one another.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to construct a liquid crystal display device as taught by Kim et al. [A] wherein the device further comprises of a light-shield layer overlapping at least part of boundary region and the protrusion since Kim et al. [A] teach that by forming the light-shield layer in such

locations helps to prevent disclination (Column 10, lines 27-29) and further to formed the light-shield layer and the protrusion on opposite substrates as taught by Kim et al. [B], since Kim et al. [B] teach that such configuration helps to prevent leakage of light from occurring (Paragraph 0052).

As to claim 2: Kim et al. [B] further disclose in Figure 2B that the light-shield layer (element 25) is placed with a predetermined spacing from the liquid crystal layer.

As to claim 4: Kim et al. [A] further disclose in Figure 4 and Column 6 lines 13-16 that at least one of the first substrate and the second substrate has at least one protrusion (element 17 or 27) having a slant side formed on the surface facing the liquid crystal layer, and the direction in which liquid crystal molecules tilt in each of the plurality of liquid crystal regions is defined by orientation-regulating force of the at least one protrusion.

As to claim 7: Kim et al. [A] further disclose in Column 6 lines 13-14 that the first substrate further includes switching elements respectively placed to correspond to the plurality of picture-element regions, and the first electrode comprises a plurality of picture-element electrodes (as shown in Figure 7, element 20) respectively placed for the plurality of picture-element regions and switched with the switching elements, and the second electrode comprises at least one counter electrode (as shown in Figure 7, element 10) opposed to the plurality of picture-element electrodes.

As to claim 20 (New): Kim et al. [A] further disclose in Figure 4 that the device further comprising of a pair of polarizing plates placed opposing to each other via the liquid crystal layer so that their polarization axes (elements P1, P2) are substantially perpendicular to each other, wherein in each of the plurality of picture-element regions, at least one of the first substrate and

the second substrate has an additional light-shield layer (as shown in Figure 16, element 11) overlapping at least part of regions (the v-shaped regions) in which liquid crystal molecules tilt in directions substantially parallel to the polarization axes of the pair of polarizing plates when a voltage is applied between the first electrode and the second electrode.

As to claim 25 (New): Kim et al. [A] further disclose in Figure 4 that the boundary region is V-shaped.

With respect to claim 8 (Amended): Kim et al. [A] disclose in Figure 4 (example cross-section as shown in Figure 7) a liquid crystal display device comprising

a first substrate (element 200), a second substrate (element 100), and a vertical alignment type liquid crystal layer (Column 1, line 16) including liquid crystal molecules having negative dielectric anisotropy (Column 1, lines 61-62) disposed between the first substrate and the second substrate,

the device having a plurality of picture-element regions each defined by a first electrode (element 20) placed in the first substrate on the side facing the liquid crystal layer and a second electrode (element 10) placed in the second substrate to oppose to the first electrode via the liquid crystal layer,

in each of the plurality of picture-element regions, the liquid crystal layer having a plurality of liquid crystal regions different in the direction in which liquid crystal molecules tilt when a voltage is applied between the first electrode and the second electrode (as shown in Figure 4),

the plurality of liquid crystal regions of the liquid crystal layer including a first liquid crystal region of which the retardation value for light incident on the liquid crystal layer

obliquely in a direction oblique from the normal to the liquid crystal layer increases with rise of an applied voltage and a second liquid crystal region of which the retardation value first decreases and then increases, at least one of the first and second liquid crystal regions being V-shaped (as shown in Figure 4, wherein the direction of the liquid crystal molecule tilt are controlled by the protrusions (element 17 or 27) formed).

Kim et al. [A] failed to specifically disclose a light-shielding layer selectively shading the first liquid crystal region, but not the second liquid crystal region, when the device is observed in the direction oblique from the normal to the display panel.

However, Kim et al. [B] teach in Figure 2B that the light-shield layer (element 25) is formed on opposite substrates with respect to the protrusion (element 53), thus, having the functionality of selectively shading the first liquid crystal region, but not the second liquid crystal region, when the device is observed in the direction oblique from the normal to the display panel.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to construct a liquid crystal display device as taught by Kim et al. [A] wherein the device further comprises of a light-shield layer formed on opposite substrate as the protrusion as taught by Kim et al. [B], since Kim et al. [B] teach that such configuration helps to prevent leakage of light from occurring (Paragraph 0052).

<u>As to claim 10</u>: Kim et al. [A] further disclose in Figure 4 and Column 6 lines 13-16 that at least one of the first substrate and the second substrate has at least one protrusion (element 17 or 27) having a slant side formed on the surface facing the liquid crystal layer, and the direction

in which liquid crystal molecules tilt in each of the plurality of liquid crystal regions is defined by orientation-regulating force of the at least one protrusion.

As to claim 13: Kim et al. [A] further disclose in Column 6 lines 13-14 that the first substrate further includes switching elements respectively placed to correspond to the plurality of picture-element regions, and the first electrode comprises a plurality of picture-element electrodes (as shown in Figure 7, element 20) respectively placed for the plurality of picture-element regions and switched with the switching elements, and the second electrode comprises at least one counter electrode (as shown in Figure 7, element 10) opposed to the plurality of picture-element electrodes.

As to claim 21 (New): Kim et al. [A] further disclose in Figure 4 that the device further comprising of a pair of polarizing plates placed opposing to each other via the liquid crystal layer so that their polarization axes (elements P1, P2) are substantially perpendicular to each other, wherein in each of the plurality of picture-element regions, at least one of the first substrate and the second substrate has an additional light-shield layer (as shown in Figure 16, element 11) overlapping at least part of regions (the v-shaped regions) in which liquid crystal molecules tilt in directions substantially parallel to the polarization axes of the pair of polarizing plates when a voltage is applied between the first electrode and the second electrode.

With respect to claim 26 (New): Kim et al. [A] disclose in Figure 9A a liquid crystal display device comprising

a first substrate, a second substrate (Column 8, lines 1-3), and a vertical alignment type liquid crystal layer (Column 1, line 16) including liquid crystal molecules having negative dielectric anisotropy (Column 1, lines 61-62) disposed between the first substrate and the second

substrate, the liquid crystal display device being a vertical alignment type display wherein in an off state liquid crystal molecules of the liquid crystal layer are aligned substantially vertical (Column 1, lines 16-24) and at least one vertical alignment film is provided for so aligning the liquid crystal molecules in the substantially vertical manner in the off state, and a pair of polarizing plates placed opposing to each other via the liquid crystal layer so that their polarization axes (elements P1 and P2) are substantially perpendicular to each other,

the device having a plurality of picture-element regions each defined by a first electrode placed in the first substrate on the side facing the liquid crystal layer and a second electrode placed in the second substrate to oppose to the first electrode via the liquid crystal layer,

in each of the plurality of picture-element regions, the liquid crystal layer having a plurality of liquid crystal regions different in the direction in which liquid crystal molecules tilt when a voltage is applied between the first electrode and the second electrode (as shown in Figure 9A), and

a first region and a second region in each of which liquid crystal molecules tilt in directions substantially parallel to the polarization axes of the pair of polarizing plates when a voltage is applied between the first electrode and the second electrode (wherein the liquid crystal molecules in the vicinity of the protrusion, element 21, are tilted in directions substantially parallel to the polarization axes).

Kim et al. [A] failed to specifically disclose that at least one light-shield layer is formed to overlap each of the first region and the second region and that the light-shield layer is X-shaped.

However, Kim et al. [B] teach in Figure 2B of forming a light-shield layer (element 25) corresponding to the protrusion (element 53), therefore, since Kim et al. [A] disclose in Figure 9A that the protrusion (element 21) is formed in an X-shape, the light-shield layer is then formed in an X-shape. Further, since the light-shield layer (element 25) is formed wider than the protrusion (element 53), hence, the liquid crystal in the vicinity of the protrusion that are tilted in directions substantially parallel to the polarization axes will be overlapped with the light-shield layer.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to construct a liquid crystal display device as taught by Kim et al. [A] wherein the device further comprises of a light-shield layer formed corresponding to the protrusion as taught by Kim et al. [B], since Kim et al. [B] teach that such configuration helps to prevent leakage of light from occurring (Paragraph 0052).

Claims 5-6 and 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al. [A] (US 6567144) and Kim et al. [B] (US 2001/0019388) in view of Song et al. (US 6710837).

As to claims 5 and 11: Kim et al. [A] and Kim et al. [B] disclose all of the limitations set forth in the previous claims, but failed to disclose that at least one of the first electrode and the second electrode has at least one opening, and the direction in which liquid crystal molecules tilt in each of the plurality of liquid crystal regions is defined by an inclined electric field generated at an edge portion of the at least one opening when a voltage is applied between the first electrode and the second electrode.

However, Song et al. teach in Figure 5 of forming all of the protrusions on one substrate while forming at least one opening (element 270) on the other opposing substrate.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to construct a liquid crystal display device as taught by Kim et al. [A] and Kim et al. [B] wherein one of the substrates comprise only of at least one opening as taught by Song et al., since Song et al. teach that such structure allows the prevention of light leakage and helps in increasing contrast ratio (Column 6, line 46 through Column 7, line 5; Column 7, lines 26-28; Column 7, line 47 through Column 8, line 9).

As to claims 6 and 12: Kim et al. [A] and Kim et al. [B] disclose all of the limitations set forth in the previous claims, and Kim et al. [A] further disclose in Figure 4 and Column 6 lines 13-16 that at least one of the first substrate and the second substrate has at least one protrusion (element 17 or 27) having a slant side formed on the surface facing the liquid crystal layer.

Kim et al. [A] and Kim et al. [B] failed to disclose that at least one of the first electrode and the second electrode has at least one opening.

However, Song et al. teach in Figure 5 of forming all of the protrusions on one substrate while forming at least one opening (element 270) on the other opposing substrate, such that the direction in which liquid crystal molecules tilt in each of the plurality of liquid crystal regions is defined by orientation-regulating force of the at least one protrusion and an inclined electric field generated at an edge portion of the at least one opening when a voltage is applied between the first electrode and the second electrode.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to construct a liquid crystal display device as taught by Kim et al. [A] and

Kim et al. [B] wherein one of the substrates comprise only of at least one opening as taught by Song et al., since Song et al. teach that such structure allows the prevention of light leakage and helps in increasing contrast ratio (Column 6, line 46 through Column 7, line 5; Column 7, lines 26-28; Column 7, line 47 through Column 8, line 9).

Claims 14-16, 19 and 22-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al. [A] (US 6567144).

With respect to claim 14 (Amended): Kim et al. [A] disclose in Figure 4 (example cross-section as shown in Figure 7) a liquid crystal display device comprising

a first substrate (element 200), a second substrate (element 100), and a vertical alignment type liquid crystal layer (Column 1, line 16) including liquid crystal molecules having negative dielectric anisotropy (Column 1, lines 61-62) disposed between the first substrate and the second substrate, the liquid crystal display device being a vertical alignment type display wherein in an off state liquid crystal molecules of the liquid crystal layer are aligned substantially vertical (Column 1, lines 16-24) and at least one vertical alignment film (elements 15, 25) is provided for so aligning the liquid crystal molecules in the substantially vertical manner in the off state, and a pair of polarizing plates placed opposing to each other via the liquid crystal layer so that their polarization axes (elements P1 and P2) are substantially perpendicular to each other,

the device having a plurality of picture-element regions each defined by a first electrode (element 20) placed in the first substrate on the side facing the liquid crystal layer and a second electrode (element 10) placed in the second substrate to oppose to the first electrode via the liquid crystal layer,

in each of the plurality of picture-element regions, the liquid crystal layer having a plurality of liquid crystal regions different in the direction in which liquid crystal molecules tilt when a voltage is applied between the first electrode and the second electrode (as shown in Figure 4), and

a first region and a second region (the v-shaped regions) in each of which liquid crystal molecules tilt in directions substantially parallel to the polarization axes of the pair of polarizing plates when a voltage is applied between the first electrode and the second electrode.

Kim et al. [A] failed to specifically disclose at least one light-shielding layer overlapping each of a first region and a second region wherein each of the first region and the second region which are overlapped with the at least one light shield extend across a substantial part of the picture-element region.

However, Kim et al [A] disclose in another embodiment as shown in Figure 16 that a light-shield layer (element 11) is formed in regions corresponding to the first and second regions of the picture-element regions, extending across a substantial part of the picture-element region.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to construct a liquid crystal display device as taught by Kim et al. [A] wherein the device further comprises of at least one light-shield layer overlapping the first and second regions since Kim et al. [A] teach that by forming the light-shield layer in such locations helps to prevent disclination (Column 10, lines 27-29).

<u>As to claim 15</u>: Kim et al. [A] further disclose in Figure 17 that the light-shield layer (element 11) is placed substantially right on the liquid crystal layer.

As to claim 16: Kim et al. [A] further disclose in Figure 4 and Column 6 lines 13-16 that at least one of the first substrate and the second substrate has at least one protrusion (element 17 or 27) having a slant side formed on the surface facing the liquid crystal layer, and the direction in which liquid crystal molecules tilt in each of the plurality of liquid crystal regions is defined by orientation-regulating force of the at least one protrusion.

As to claim 19: Kim et al. [A] further disclose in Column 6 lines 13-14 that the first substrate further includes switching elements respectively placed to correspond to the plurality of picture-element regions, and the first electrode comprises a plurality of picture-element electrodes (as shown in Figure 7, element 20) respectively placed for the plurality of picture-element regions and switched with the switching elements, and the second electrode comprises at least one counter electrode (as shown in Figure 7, element 10) opposed to the plurality of picture-element electrodes.

With respect to claims 22-24 (New): Kim et al. [A] disclose in Figure 4 (example cross-section as shown in Figure 7) a liquid crystal display device comprising

a first substrate (element 200), a second substrate (element 100), and a vertical alignment type liquid crystal layer (Column 1, line 16) including liquid crystal molecules having negative dielectric anisotropy (Column 1, lines 61-62) disposed between the first substrate and the second substrate, the liquid crystal display device being a vertical alignment type display wherein in an off state liquid crystal molecules of the liquid crystal layer are aligned substantially vertical (Column 1, lines 16-24) and at least one vertical alignment film (elements 15, 25) is provided for so aligning the liquid crystal molecules in the substantially vertical manner in the off state,

the device having a plurality of picture-element regions each defined by a first electrode (element 20) placed in the first substrate on the side facing the liquid crystal layer and a second electrode (element 10) placed in the second substrate to oppose to the first electrode via the liquid crystal layer,

in each of the plurality of picture-element regions, the liquid crystal layer having a plurality of liquid crystal regions different in the direction in which liquid crystal molecules tilt when a voltage is applied between the first electrode and the second electrode (as shown in Figure 4), and

a plurality of substantially parallel V-shaped boundary regions (as shown in Figure 4) in a picture-element region, the V-shaped boundary regions separating the plurality of liquid crystal regions from each other.

Kim et al. [A] failed to specifically disclose at least one light-shielding layer overlapping the plurality of the V-shaped boundary regions.

However, Kim et al [A] disclose in another embodiment as shown in Figure 16 that a light-shield layer (element 11) is formed in the V-shaped boundary regions wherein the ends of the liquid crystal molecules closer to the substrate having the light-shield layer go away from the boundary region in the area where the boundary region overlaps the light-shielding layer when a voltage is applied between the first electrode and the second electrode.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to construct a liquid crystal display device as taught by Kim et al. [A] wherein the device further comprises of at least one light-shield layer overlapping the plurality of

substantially parallel V-shaped regions since Kim et al. [A] teach that by forming the light-shield layer in such locations helps to prevent disclination (Column 10, lines 27-29).

Claims 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al. [A] (US 6567144) in view of Song et al. (US 6710837).

With respect to claim 17: Kim et al. [A] disclose all of the limitations set forth in the previous claims, but failed to disclose that at least one of the first electrode and the second electrode has at least one opening, and the direction in which liquid crystal molecules tilt in each of the plurality of liquid crystal regions is defined by an inclined electric field generated at an edge portion of the at least one opening when a voltage is applied between the first electrode and the second electrode.

However, Song et al. teach in Figure 5 of forming all of the protrusions on one substrate while forming at least one opening (element 270) on the other opposing substrate.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to construct a liquid crystal display device as taught by Kim et al. [A] wherein one of the substrates comprise only of at least one opening as taught by Song et al., since Song et al. teach that such structure allows the prevention of light leakage and helps in increasing contrast ratio (Column 6, line 46 through Column 7, line 5; Column 7, lines 26-28; Column 7, line 47 through Column 8, line 9).

As to claim 18: Kim et al. [A] disclose all of the limitations set forth in the previous claims, and Kim et al. [A] further disclose in Figure 4 and Column 6 lines 13-16 that at least one

of the first substrate and the second substrate has at least one protrusion (element 17 or 27) having a slant side formed on the surface facing the liquid crystal layer.

Kim et al. [A] failed to disclose that at least one of the first electrode and the second electrode has at least one opening.

However, Song et al. teach in Figure 5 of forming all of the protrusions on one substrate while forming at least one opening (element 270) on the other opposing substrate, such that the direction in which liquid crystal molecules tilt in each of the plurality of liquid crystal regions is defined by orientation-regulating force of the at least one protrusion and an inclined electric field generated at an edge portion of the at least one opening when a voltage is applied between the first electrode and the second electrode.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to construct a liquid crystal display device as taught by Kim et al. [A] wherein one of the substrates comprise only of at least one opening as taught by Song et al., since Song et al. teach that such structure allows the prevention of light leakage and helps in increasing contrast ratio (Column 6, line 46 through Column 7, line 5; Column 7, lines 26-28; Column 7, line 47 through Column 8, line 9).

***Response to Arguments***

Applicant's arguments with respect to all claims have been considered but are moot in view of the new ground(s) of rejection.

### *Conclusion*

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to W. Patty Chen whose telephone number is (571)272-8444. The examiner can normally be reached on 8:00-5:00 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David C. Nelms can be reached on (571)272-1787. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

W. Patty Chen
Examiner
Art Unit 2871

WPC
12/08/06

Andrew Schechter
ANDREW SCHECHTER
PRIMARY EXAMINER